DOCUMENT RESUME

ED 154 794 IR 005 859

TITLE	Executive Summary: Program Planning Assistance.
INSTITUTION	Stanford Univ., Calif. Stanford Electronics Labs.
SPONS AGENCY	National Iranian Radio and Television, Tehran.
PUB DATE	76
NOTE	52p.; For related documents, see ED 115 278 and IR 005 851-858
EDRS PRICE	MF-$0.83 HC-$3.50 Plus Postage.
DESCRIPTORS	Cost Effectiveness; *Developing Nations; *Educational Needs; *Educational Radio; *Educational Television; Growth Patterns; Manpower Utilization; *Program Planning
IDENTIFIERS	Iran

ABSTRACT

The conclusions and recommendations of nine other reports concerning the educational needs of Iran and the role of television in meeting these needs are summarized. Chapter 1 discusses educational needs, the effectiveness of television in education, and the recommended role for Educational Radio and Television of Iran (ERTI). Chapter 2 deals with more specific subject area recommendations in higher education; primary, guidance cycle, and high school; literacy; farmer education; and occupational training. The capabilities of ERTI and potential ERTI program areas are discussed in more detail in the final chapter, and a suggested schedule for planning and implementation is given. (VT)

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EXECUTIVE SUMMARY

Program Planning Assistance

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Bruce B. Lusignan

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

Prepared under

National Iranian Radio and Television Contract

NIRT No.1

Radioscience Laboratory
COMMUNICATION SATELLITE PLANNING CENTER
Stanford University
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IR005837

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CHAPTER I
EDUCATIONAL NEEDS AND THE ROLE OF TELEVISION

A. INTRODUCTION.

This report summarizes the conclusions and recommendations of Part B of the National Iranian Radio and Television Contract No. 1. The detailed results are presented in the accompanying reports. References 1 through 9.

Background:

Figure 1 presents Iranian government projections of oil revenues and the changes in critical development areas that are required to meet important development goals. These development objectives properly place a great demand on the existing educational institutions, a demand that in many cases cannot be met by conventional approaches.

Experience with television shows that, in many of the critical areas, television can extend the capacity of the educational system to meet the objectives. With television, effective teaching can be provided with far less instructional staff and with staff that are less experienced. Television's effectiveness is greater with the education of adults than with the education of children.

Recommendations:

- Specific recommendations (page 16) are made for use of television in Higher Education, Training of Teachers, Adult Literacy Programs, and Farmer Training. Guidelines are given for selection of additional projects in Occupational Training.

- The approaches recommended would make maximum use of the specialized expertise and educational or instructional staff currently available in Iranian institutions and ministries, using television to extend their capabilities rather than to substitute for them. Simple inexpensive video production techniques are recommended for efficiency and effectiveness in the specific subject areas.

- The planned resources of Educational Radio and Television of Iran (ERTI) are adequate to carry out the recommended programs. Capacity would still be available to address areas of information and general audience programming.

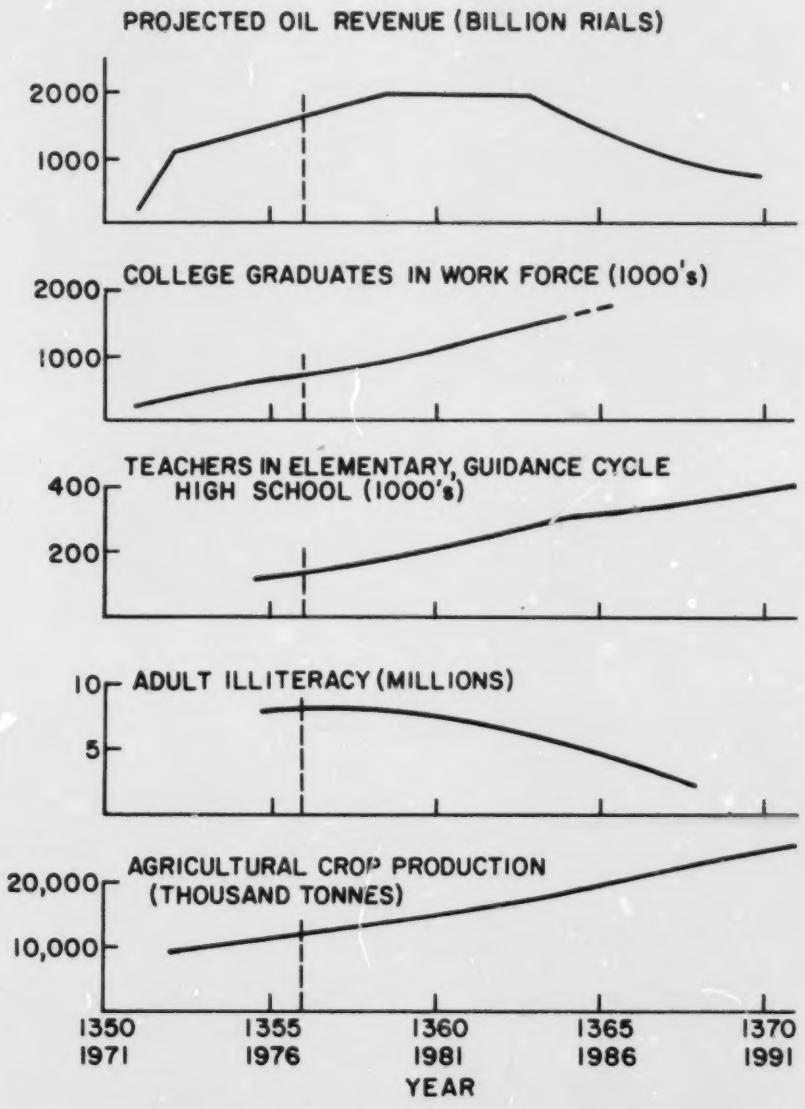


Figure 1. PROJECTED DEVELOPMENT GOALS.

B. EDUCATIONAL NEEDS

The education and training needs of Iran were developed in conjunction with Iran's Plan and Budget Organization (Ref. 1). The needs assessment was performed with the aid of a computer projection model that describes the growth of different sectors of Iran's economy under the various assumptions of oil revenues and government investment policy. The sector growth is combined with an analysis of manpower requirements and educational levels needed in each sector. This yields quantitative estimates of the number of graduates from Iran's education and training programs that will be needed if the economic growth is to occur as projected.

National development in the next years will depend heavily on the ability of the educational and instructional programs to provide trained manpower. A number of projections have been made reflecting different growth rates and different emphasis on economic sectors. While detailed educational needs vary with the assumptions, the main conclusions are essentially the same. Tables I and II (Ref. 1, pages 9 and A-6) present manpower projections in different job categories for the base year 1972 and for 1982. The results are typical of a fairly moderate rate of growth (10.1%); thus they present an educational demand lower than the more ambitious economic projections.

Each of the occupations of Table II requires a particular level of education and training. Together they define the national education capacity needed to support economic development. This capacity is presented in Table III (Ref. 1, page 11). When this needed capacity is compared with current and planned capabilities of Iran's educational institutions, major shortages are apparent.

In the higher education area the shortages are two to threefold, i.e., the number of students admitted would have to double or triple in the next few years to support the projected economic growth. Much of the university-level need is in the area of mid-management and administrative positions. But there is also great demand for university

Table I

Possible Scenario for the Occupational Distribution of Workers by Sector: 1982

Sector \ Occupation	Professional Technical & Related	Managers & Admins.	Clerical Workers	Sales Workers	Service Workers	Agricultural Workers	Miners & Quarry-men	Transport Equipment Operators & Related	Industrial & Production	TOTAL
Agriculture, etc.	33,260	-	-	-	-	3,126,440	-	33,260	66,520	3,326,000
Manufacturing and Mining	212,240	151,600	363,840	90,960	60,640	-	60,640	121,280	1,970,800	3,032,000
Construction	77,900	171,380	62,320	-	15,580	-	-	62,320	1,152,920	1,559,000
National Oil and Gas	.240	.160	.520	.80	.80	-	.80	.200	2,640	4,000
Utilities (Water & Power)	7,740	4,300	16,340	860	1,720	-	-	6,020	49,020	86,000
Transport & Communication	14,190	28,380	99,330	4,730	14,190	-	-	193,930	118,250	473,000
Other Services (Commerce, Trade, etc.)	502,351	9,804	451,576	908,412	898,752	61,098	-	83,108	179,895	3,095,000
TOTAL	848,221	365,624	993,926	1,005,042	991,262	3,187,538	60,720	500,118	3,540,045	11,492,496

Table II

Projected Occupation of Employed Labor Force by Sector in 1972

Occupation / Sector	Professional, Technical & Related	Managers & Administrators	Clerical Workers	Sales Workers	Service Workers	Agricultural Workers	Miners & Quarrymen	Transport Equipment Operators & Related	Industrial and Production	TOTAL
Agriculture, Forestry, & Related	494	330	3,856	182	3,986	3,629,563	---	---	15,428	3,653,839
Mining and Manufacturing	17,037	7,391	40,460	28,505	58,626	4,173	9,056	58,672	1,660,916	1,884,836
Oil	3,000	2,000	6,500	1,000	1,000	---	1,000	7,000	28,000	49,500
Construction	10,103	2,106	11,915	1,007	4,298	903	---	21,289	657,985	709,606
Electricity & Utilities	8,185	---	24,595	1,118	11,120	170	---	3,998	31,312	80,498
Commerce, Trade	13,785	709	52,250	670,360	13,345	446	---	31,561	7,392	789,848
Transport, etc.	5,469	3,694	51,882	2,325	17,127	1,203	---	251,523	106,599	439,822
Services	359,519	6,577	283,322	4,693	654,530	44,957	---	30,198	126,291	1,510,087
Activities not Adequately Described	1,492	270	4,174	449	3,244	539	---	---	6,145	16,313
TOTAL	419,084	23,077	478,954	709,639	767,276	3,681,954	10,056	404,241	2,640,068	9,134,429

Table III

Manpower Planning Group Employment by Education
(10.1% GNP Growth Assessment (1,000's))

Year / Educational Level	1978	1979	1980	1981	1982
Illiterate and Incomplete Primary	5,452	5,416	5,362	5,279	5,146
Primary	2,937	3,143	3,371	3,624	2,898
Incomplete Secondary	801	626	654	683	714
Secondary	853	929	1,014	1,110	1,217
Up to Masters	522	573	632	698	772
Masters & PhD	282	312	347	386	432
TOTAL	10,646	10,999	11,379	11,779	12,177

Source: Plan and Budget Organization: Manpower Planning Group, Manpower Forecasting Model.

graduates in many other important areas. Teacher training is a particularly critical area.

On the elementary school, guidance cycle, and high school levels there are also important shortages. Expansion of the school system has been unable to keep pace with the demands of population growth. Rapid growth has resulted in a larger proportion of youths in the general population and an increase in school needs even exceeding the population growth rate. Even with a reduction in future population growth, the needs for grade-school education will remain very high over the next ten to fifteen years.

Figure 2 (Ref. 3, page 3) presents projections of the teachers needed for the grade schools if universal education through high school is to be made available in the next ten years. The annual increases represent the number of graduates from teacher-training institutions needed to meet the objectives implied by this goal. The teacher-training needs represented by Fig. 2 rises sharply during the period when grade-schools are increasing in number and then reduces rapidly once the major teacher shortages are eliminated.

The rapid increase and then decrease in teacher training facilities results from having to make up for past shortages. Similar effects are found in most other areas of higher education. A high rate of economic development requires an even greater initial rate of growth of the education and training institutions needed to support the development.

Past limitations in availability of elementary schools have resulted in a high rate of illiteracy among Iran's adult population. There are about 7 million people between the ages of 15 and 50 without basic reading, writing, and arithmetic skills. This number will increase somewhat until the elementary school system is completed. An adult literacy campaign, the National World Literacy Campaign, has been organized to serve this population. The program's goals are to reduce adult illiteracy to 15% in twelve years. Their yearly train-

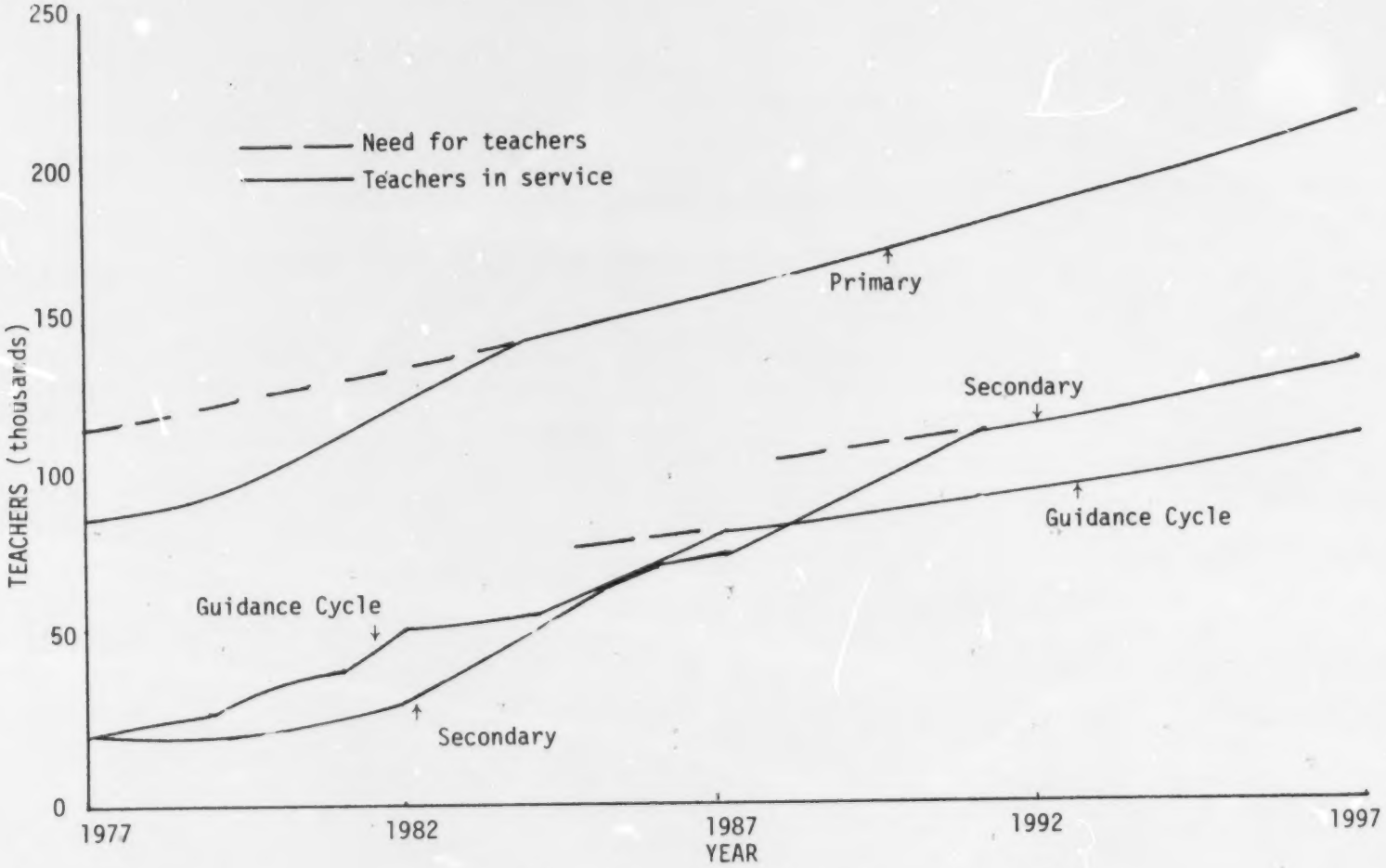


Fig. 2 Meeting Teacher Needs

ing goals are shown in Table IV (Ref. 4, page 6). Three- or six-month programs will emphasize basic reading and numerical skills but will also include functional applications in work and other areas of adult education. The approach is based heavily on community involvement, with facilities and literacy trainers expected to come largely from local organizations.

Iran's economic growth implies changes in many different kinds of occupations as well as changes in the numbers of people employed in different jobs. If the basic education is provided by the institutions described above (whether formally or informally), there is still a need for specific occupational training. Most such training is simple and is provided on the job by the employer, foreman or fellow workers. However, there are some areas where the needs are greater and must be addressed more systematically.

The largest single occupation in Iran is farming; about one-third of the work force, 3.3 million people, are in agriculture. They work on about 2.5 million small and medium-sized traditional farms, mostly family managed. The total number of farmers is expected to decrease slightly in the future, but the nation still will be heavily dependent on them and their productivity. The National Cropping Plan projects that a threefold increase in agricultural productivity will be required to make Iran nearly self-sufficient in food in the next twenty years; see Table V (Ref. 5, page 19). The physical and economic resources necessary for this increase are available, but more efficient farming practices must be introduced to the traditional farmers. This represents the largest single occupational training need. It is currently being addressed by Iran's agricultural extension workers, but the large numbers of farms scattered throughout more than 40,000 remote villages makes it extremely difficult for the advisors to reach the farmers as often as is needed.

There are other areas of occupational training important to national development. The largest growth in occupations is projected to occur in clerical jobs. In these and in other skill areas, expanded

Table IV

Target Literacy Enrollments

Year	Target Enrollments (thousands)	
	Two Cycles*	One Cycle**
1353	693	462
1354	847	565
1355	1028	689
1356	1225	816
1357	1450	967
1358	1636	1090
1359	1910	1273
1360	2220	1480
1361	2135	1423
1362***	1423	948
1363	1637	1092
1364	1893	1262
1365	2178	1452
1366	2497	1665
1367	983	665

---

* Assumes that 40% of those originally enrolled complete both cycles.

** Assumes a 60% completion rate.

*** From 1362 to 1367 only females are enrolled. Male literacy is achieved with the 1361 enrollments.

Table V

Recommended Pattern Compared with Forecast Demand

Commodity	1371 (1992) demand '000 tonnes	Forecast gross production '000 tonnes	Per cent of forecast	Production increase over 1972 per cent
Wheat (human)	7386	7426	100	180[1]
Rice (paddy)	2618	2731	104	251
Pulses (human)	431	431	100	408[1]
Soya, sunflower, and cotton seed	1492	1280	86	372
Vegetable oil	498	421	85	
Sugar	1866	1626	87	265
Potatoes	6461	2200		551
Cucurbits		3070	130	240
market garden crops)		3151		516
Fruit and nuts	5311	4792	90	278
Cotton lint	300	256	85	150
Linseed oil	no projection	5	-	-
Mutton [2]	1142	344	30	88
Beef	489	157	32	45
Milk	7993	3443	43	79
Poultry	368	405	110	440
Eggs	328	361	110	325

1 of gross production

2 including goat meat

training capacity is needed through a combination of employer training programs, and government and private institutions.

Iran's goals of rapid development in the next ten to fifteen years will require very substantial increases in national training and educational institutions. The needs are increased by recent high population growth rates that have disporportionally increased the number of school-age children. Adult literacy programs to allow the current population to contribute to and participate in development add greatly to the educational needs. And the need for farmer training to work towards agricultural self-sufficiency further stretches the national educational resources.

When the goals are combined, the total educational and training needs greatly exceed the capabilities of the traditional institutions. (The educational needs, in fact, are much greater than in an industrialized country of the same population; the industrialized country has proportionally less school age children, much less need for training in adult literacy, farmer education, and less rapid growth of the number of teachers and other professions.)

Television in education is considered to be one means of better matching Iran's educational resources to the national needs.

C. EFFECTIVENESS OF TELEVISION IN EDUCATION

Review of educational television (ETV) uses in many projects (Ref. 2) has shown ETV to be very effective in some applications and ineffective in others. While experiences vary somewhat from project to project, in general television is able to substitute effectively for recited lectures in education but not for other important components of the educational process.

On the college level, lectures are a major part of the teaching process, and television can allow great increases in student enrollment with little increase in staff size. Even with a television lecture course, however, provision must be made for periodic informal discussion of material with a knowledgeable instructor or "mentor." And normal provision must be made for courses such a laboratory and

workshops, and for examination, registration and advising of students. Even taking this into account, the use of television can double or triple the capacity of a university with little increase in staff size.

The use of television at the university level is important generally to Iran. It is also important to the training of teachers for the lower levels of education. For this need (Fig. 2), the capacity of the teacher training institutions must increase very rapidly. There would be shortages in staff for the training institutions even with television. However, experience with television at the college level indicates not only that the number of staff is reduced but also that the training level of the instructors or mentors who meet with the students can be lower with television than without it for normal lectures. This allows graduates of an institution to be used directly to expand the institution staff.

The direct use of television in grades K through 12 has been tried in many countries in the last ten years. Effective education at this age level, however, involves more direct interaction with the students than does college education. Although research indicates little or no significant difference in the amount of learning with television, the research also indicates little reduction in the number of teachers or the teacher training required for effective education. Those projects still continuing accompany the introduction of television with major teacher training efforts. Television used in this way helps coordinate major content reform but does not reduce the need for teachers.

Although experience with television in adult literacy programs has been less extensive, there are indications that television is able to reduce significantly (but not eliminate) the need for local instructors. The experience of Pakistan's Lahore literacy project indicates that if a highly qualified literacy teacher presents lessons through television, local classes can have larger sizes and less experienced local teachers. For low drop-out rates with television, the class

sizes can be tripled and local instructor training reduced in several weeks.

The uses of television, radio, and film also have been found to be effective in introducing new agricultural techniques to traditional farmers. Care must be taken to ensure that the information is presented at the appropriate time of the year, that the farmer has access to the resources needed for the change being recommended, and that the recommendations account for the farmer's point of view. It is more effective if a local lead farmer is selected to lead discussions on the material and provide interaction with agricultural extension service workers.

In most other areas of occupational training, television as a broadcast medium has not been effective. Where procedural skills, such as simple calculations or filing, or operational skills such as typing or machine operation are required, the trainee must closely mix instructions with actual practice of the skill being taught. In addition, employers need to schedule training according to their needs, not to a broadcast schedule. Broadcast television or radio does not allow the necessary flexibility. However, video cassettes, slide-audio tape, and audio tape alone are effective media to use for such applications. The benefits, as with the other uses of media, come from reductions in the numbers and in the experience required of the training staff.

Television and related media have been found to be effective in many areas important to Iran's educational goals. The extensions of educational capacities made possible by the television could help close the gap between the capabilities of the existing institutions and the capabilities actually needed to support national development. Many of the dramatic shortages in the next ten years can be reduced or eliminated by proper application of the national television resources.

For successful introduction of television in the major education areas, it is necessary to make effective use of the resources of existing educational institutions as well as the national television resources.

D. RECOMMENDED ROLE FOR ERTI

In the successful uses of television that have been reviewed, the medium has not replaced the educational institutions but rather extended their capabilities. There is still the need for the coordinated development of the educational curriculum instructors and administrative staff interacting with the students. Television is a medium that can be an important part of education, but it is not an educational institution itself.

In the areas with the greatest shortages of capacity of Iran's educational system, there are existing institutions with defined responsibilities. They employ most of the subject-area experts and teaching staff of the nation. It seems feasible to meet the national educational goals in these areas by extending the capabilities of the existing institutions with television. It does not appear feasible to meet the goals by duplicating the instruction and administrative resources of the existing institutions. The additional instructional and administrative organizations that would be needed are simply not available.

The understanding of television and interest in it varies widely from institution to institution. In addition, the sophistication of content knowledge and the complexity of television production required vary with the content area. For these reasons the most appropriate role for ERTI in each case will vary with the application. In some areas it will be necessary only to provide television facilities and planning support to existing institutions. In others, ERTI would develop programs from course descriptions developed by the other institutions. In some cases ERTI would develop educational programs independently and offer them to potential user institutions and even provide their own local training facilities.

In the major areas of national educational needs, Higher Education, Teacher Training, Literacy, and Farmer Education, specific roles for ERTI are recommended. In the area of Occupational Training, guidelines are provided for selecting between a range of

potential projects. The roles recommended for ERTI are summarized below. They are described in more detail in Chapter II and in accompanying reports.

- o In the area of Higher Education it is recommended that simple television production facilities (studio classrooms) be provided to Iran's major universities. This will allow them to broadcast their core curriculum courses to increased student enrollments in their local areas. ERTI should provide these institutions with planning support and perhaps a demonstration facility to help them estimate the impact of television and develop its use.

- o For education through high school it is recommended that ERTI continue support of the Free University of Iran in producing television courses for their teacher training programs. It is also recommended that ERTI explore the possibility of introducing television into the other teacher training institutions. In both cases it is important to review the extent of television use, the length of training programs, the positions for graduating trainees (primary, guidance cycle, or high school), and the potential source of trainees. The rapid national expansion of grade-schools will create serious limitations in resources even with television. It is recommended that ERTI review the effectiveness of the current direct use of television at this level to estimate its impact on teacher demands.

- o In adult literacy it is recommended that ERTI support the community organization efforts of the National World Literacy Campaign with information radio and television broadcasts. In addition, it is recommended that they assist the campaign in creating television programs to supplement the normal literacy courses.

- o In Farmer Education it is recommended that ERTI produce a series of farmer education television programs drawing subject area experts from the Ministry of Agriculture. ERTI's planning and production groups, with the help of these experts, should simplify the production requirements, develop effective broadcast schedules suited to the different growing areas of Iran, and coordinate the programs with the agricultural extension services.

- o In the general areas of Occupational Training, it is recommended that ERTI investigate with interested institutions the use of non-broadcast media to improve their training programs. Projects considered for this application should

include video cassettes to improve management of national organizations and use of simple media to increase the rate of training of persons for clerical skills and other occupations of particularly rapid national growth.

Because the recommended role of ERTI in these major areas make maximum use of existing Iranian resources, the full resources of ERTI need not be committed to these educational and instructional areas alone. Selection of projects in other areas (motivation and informational programming), is discussed in Chapter III and in Ref. 6.

CHAPTER II

SUBJECT AREA RECOMMENDATIONS

A. HIGHER EDUCATION

The use of television in Higher Education is discussed in detail in Ref. 6.

Television broadcast of lecture courses in many universities, including Pahlavi University of Shiraz, has been able greatly to expand student enrollment with little increase in university staff. While staff must still meet periodically with the students for discussion, testing, etc., the number and training level of the staff can be considerably less.

Only lecture courses show such dramatic improvement through use of television. The full impact of television on a typical university must account for the seminar, laboratory, and workshop courses as well as the lecture courses with enrollments too small to warrant television, planning must ensure sufficient staff for all types of courses.

A computer program is developed in Ref. 7 to assess the impact on a typical curriculum and to provide planning support to universities considering introduction of television. It was applied to Pahlavi's courses in the Schools of Engineering and Humanities and Sciences, 630 courses in all and 17 degree programs. By broadcasting about 44 courses per semester - largely first and second year common courses required in most degree programs - university enrollments can be increased threefold with only a 70% rise in staff. See Fig. 3. If students view the televised lectures in their facilities, university room expansion to accommodate the increased enrollment can also be far less than without television. See Fig. 4.

Two television production techniques have been used by universities: "studio production," similar to that used for general audience programming, and "studio classroom," where cameras remotely run by a single operator televise a more normal lecture class. The studio classroom produces programs at about one-sixteenth the cost of the more complex production, requires very little adjustment on the part of the

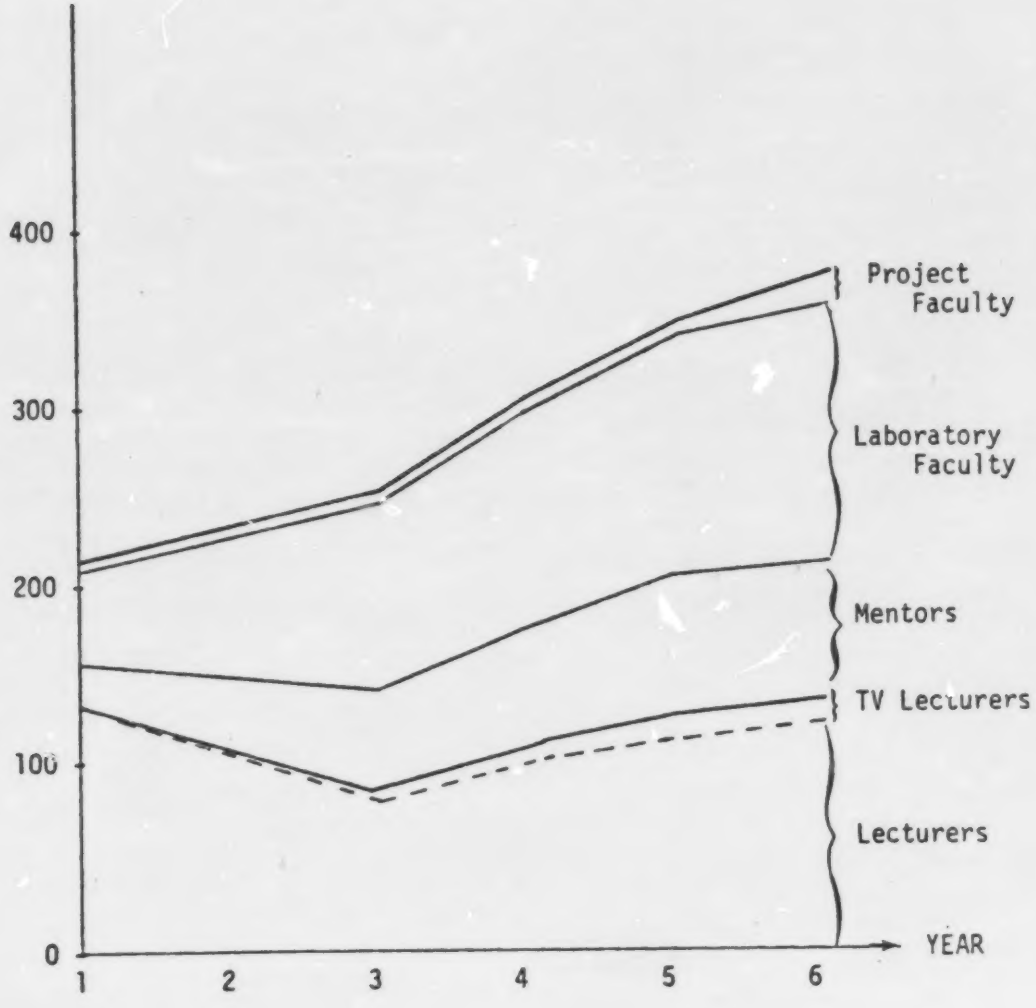


Fig. 3 Faculty Growth with TV in 44 Courses Per Semester. Student Enrollment Increases 3 Times in the Period.

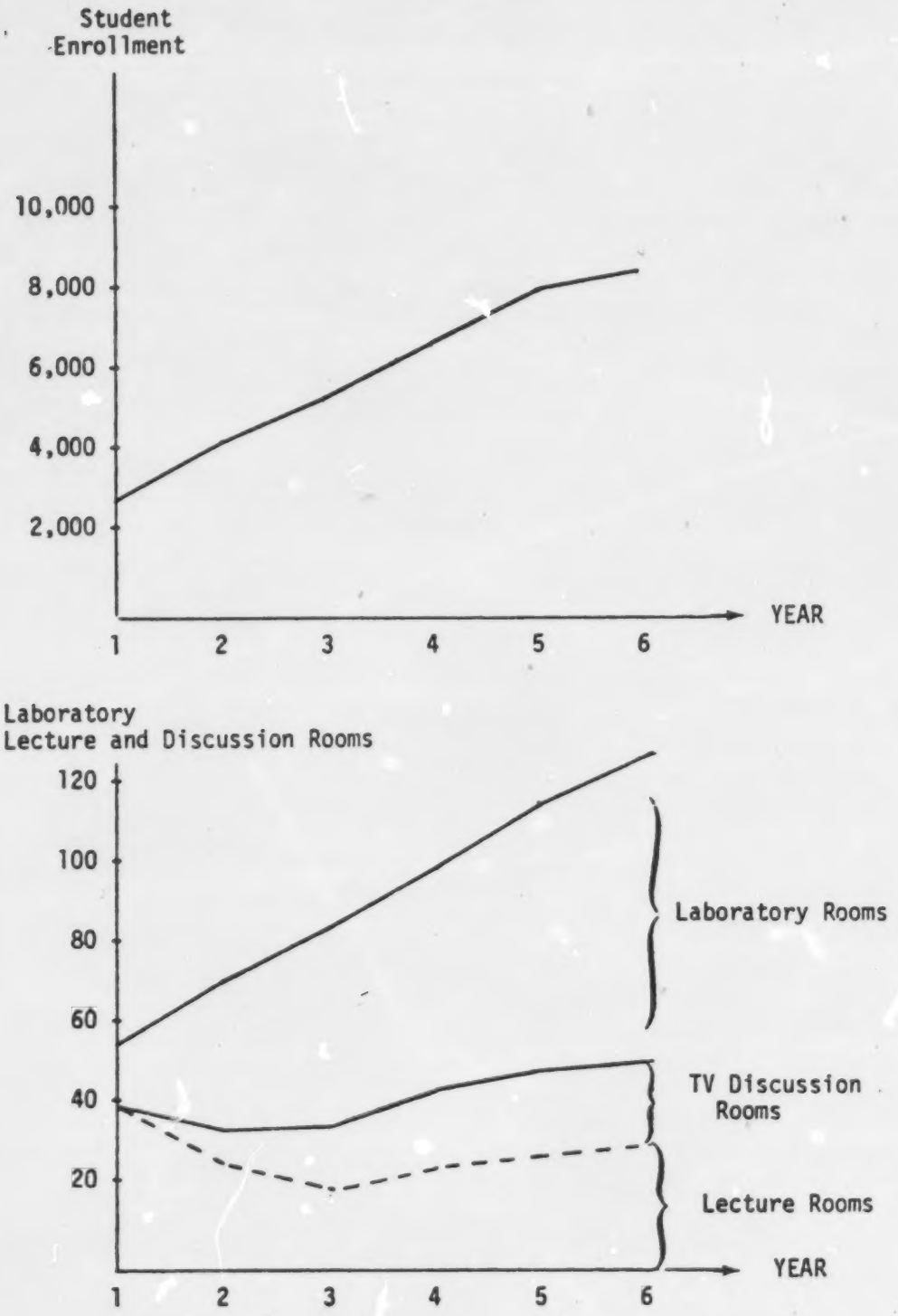


Fig. 4 Student and Facility Growth with TV in 44 Courses Per Semester.

lecturer, and, at the university level, teaches as effectively as more complex production techniques. With the studio classroom approach, several classrooms are converted to include television facilities at moderate cost. See Table VI. Then the desired classes are scheduled into those rooms. Four rooms and broadcast channels would be needed to support 44 courses per semester.

To achieve the rapid expansion in university capacity needed for national growth, it is recommended that studio classrooms and broadcast facilities be installed in approximately 10 of Iran's larger universities.

This technique draws heavily on the institution itself for content and staff and must form an integral part of the total education system, including non-television courses. For these reasons, it is recommended that the facilities be located in and operated by the universities themselves. It is recommended that NIRT provide technical support and perhaps financing of the television facilities (about $250,000 is projected per four-room facility), assist in staff planning through the use of the materials provided in Ref. 6, and implement a single video classroom in Tehran to demonstrate the application to interested institutions.

The direct benefits of this application would be to increase normal university enrollment to meet national needs. There would be additional benefits: audiences not formally enrolled in the university could benefit from many of the core courses (e.g., the teaching of Farsi); high school students could take some freshman courses to allow advance placement when entering college; and the facilities could be used to provide some mid-career training to people employed in critical areas.

B. PRIMARY, GUIDANCE CYCLE, AND HIGH SCHOOL

The recommended use of television to help meet national objectives in Primary, Guidance Cycle, and High Schools is discussed in detail in Ref. 3.

The impact of television in the detailed curriculum of teacher

Table VI

Studio Classroom Facility and Staff Costs

Staff

Director	1
Engineer	1
Scheduler	1
Secretary	1
Technician	2
TOTAL	6

For each 4 classrooms add 1 Technician

For each 40 hours per week of courses add 1 Operator full-time equivalent

Average staff salary is assumed to be 1.26 million rial ($18,000)/yr.

Average Operator salary is assumed to be .63 million rial ($9,000)/yr

Facilities

(a) Classroom each see Table I-5 (a) $ 30,000

(b) Transmitter to cover 6 1/2 km radius (Ref. 4):

24 Meter Tower	$ 4,060
10 Watt Transmitter	13,770
Antenna Subsystem	3,000
I.F. Distribution	6,000
Installation	2,000

1st Channel	$ 28,930
Additional Channel	$ 24,870

(c) Central Control Facilities depends on operation. Approx. $ 40,000

training institutions can be analyzed using the program just described. The need for rapid expansion of teacher training warrants use of television in the full curriculum of such institutions. Expanded enrollments are made possible by television and by the ability to increase the institution's staff through the use of recent graduates as "mentors" for the television courses. Both of these factors are important in providing the rapid growth needed.

While television is clearly important to meeting these goals, the problem is complex because of the interrelations of the educational systems at different levels. Teaching is the largest single profession in Iran, and meeting teacher-training goals can be blocked by lacks at any level of the educational system, from primary school through the university. Introducing television at one level might only create shortages at another.

A computer program is presented in Ref. 3 that relates student enrollment and teaching staff in the grade schools to teacher training in Normal School, Guidance Cycle Training School, and Universities. The analysis describes these institutions with and without television and identifies potential bottlenecks in the system.

Without the use of television in teacher training, the ability to meet goals of full enrollment is limited by teacher-training capacity; there are not enough college graduates to staff the growing teacher-training institutions. Several compromises can be made; the results shown in Fig. 5 represent one of the better ones.

If television is used extensively in teacher-training, institutions and <u>if sufficient trainees are available</u> to go into teaching, then the results indicated in Fig. 6 could be expected. This approach makes maximum use of mentors recruited from graduating classes to expand the teacher-training institutions. The capacities of these institutions and the direction of their graduates are adjusted to meet most effectively the national objectives. In addition to meeting the objectives more rapidly, television also significantly reduces the cost of the teacher-training institutions.

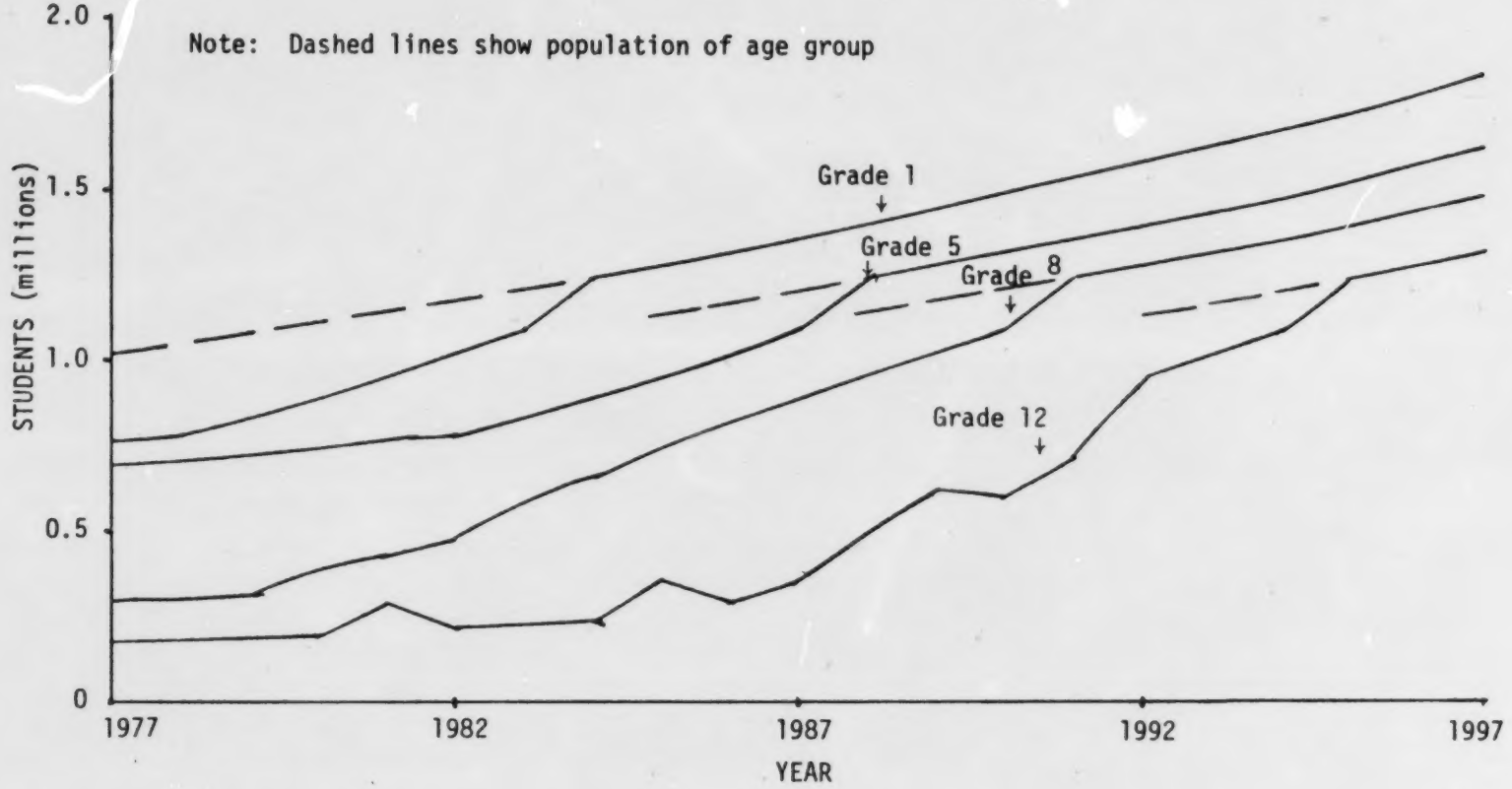


Fig. 5 Student Enrollments: Unconstrained Case, Conventional.

When television is used in teacher training, the main limitation is not in the training capacity itself, but in the number of trainees that can be attracted to go into teaching. The results presented in Fig. 6 would require up to 30% of high school graduates to go into teaching if the high schools were the only source of trainees. Clearly this is an unrealistic assumption. If a more realistic assumption is made - that 9% of high school graduates will be going into teaching - then the objectives represented by Fig. 7 would be achievable with television. This is better than a similarly limited case without television, but it is still short of the national objectives.

If objectives more like those of Fig. 6 are pursued, then it is clear that a high percentage of trainees will have to be attracted into teaching from other jobs. About 9% of the current high school graduates and less than 2% of the work force with ninth grade or high school diplomas would be adequate to meet the objectives shown in Fig. 6. The training programs for older people switching into teaching from other jobs would have to reflect their greater maturity and the time that has elapsed since they were in school.

It is recommended that ERTI continue support of the Free University of Iran's teacher training program. In addition, with the help of the analyses of Ref. 6, it is recommended that ERTI offer television support to other teacher-training institutions. If the Ministry of Education is pursuing objectives closer to those of Fig. 6, success will depend heavily on the Ministry's ability to attract and hold not only a high percentage of high school graduates but also people currently in other jobs. ERTI may help in this effort through informational programs, but the basic responsibility will be with the Ministry.

It also is recommended that discussions with the Free University and the Ministry of Education include a review of the extent of television use in the programs and the relative growths of different kinds of teacher-training programs needed for the national objectives.

It finally is recommended (Ref. 2, Chapter 7) that ERTI review their program of in-school use of television in light of the potential effect on teacher-training needs.

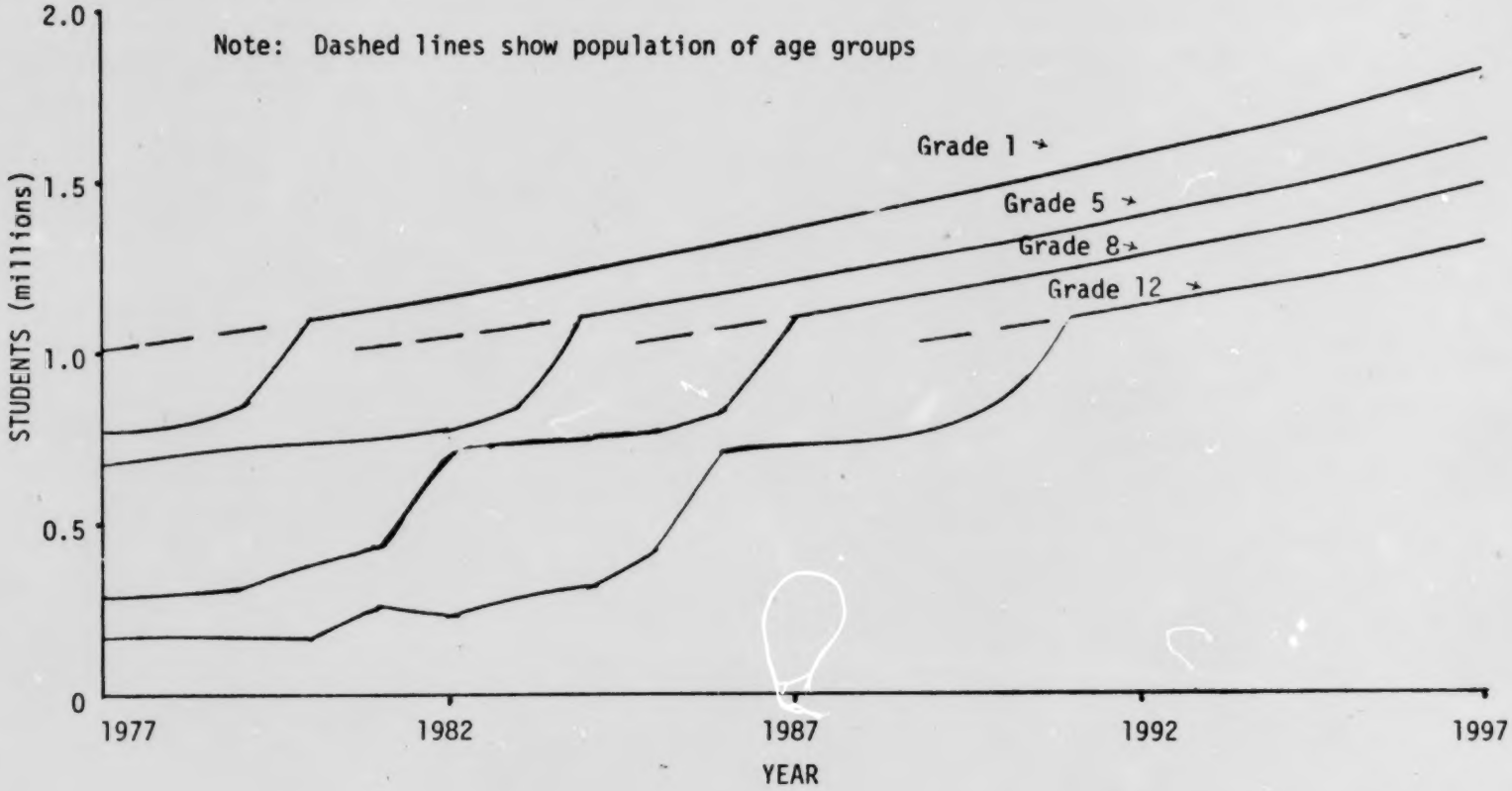


Fig. 6 Student Enrollments: Unconstrained Case with TV.

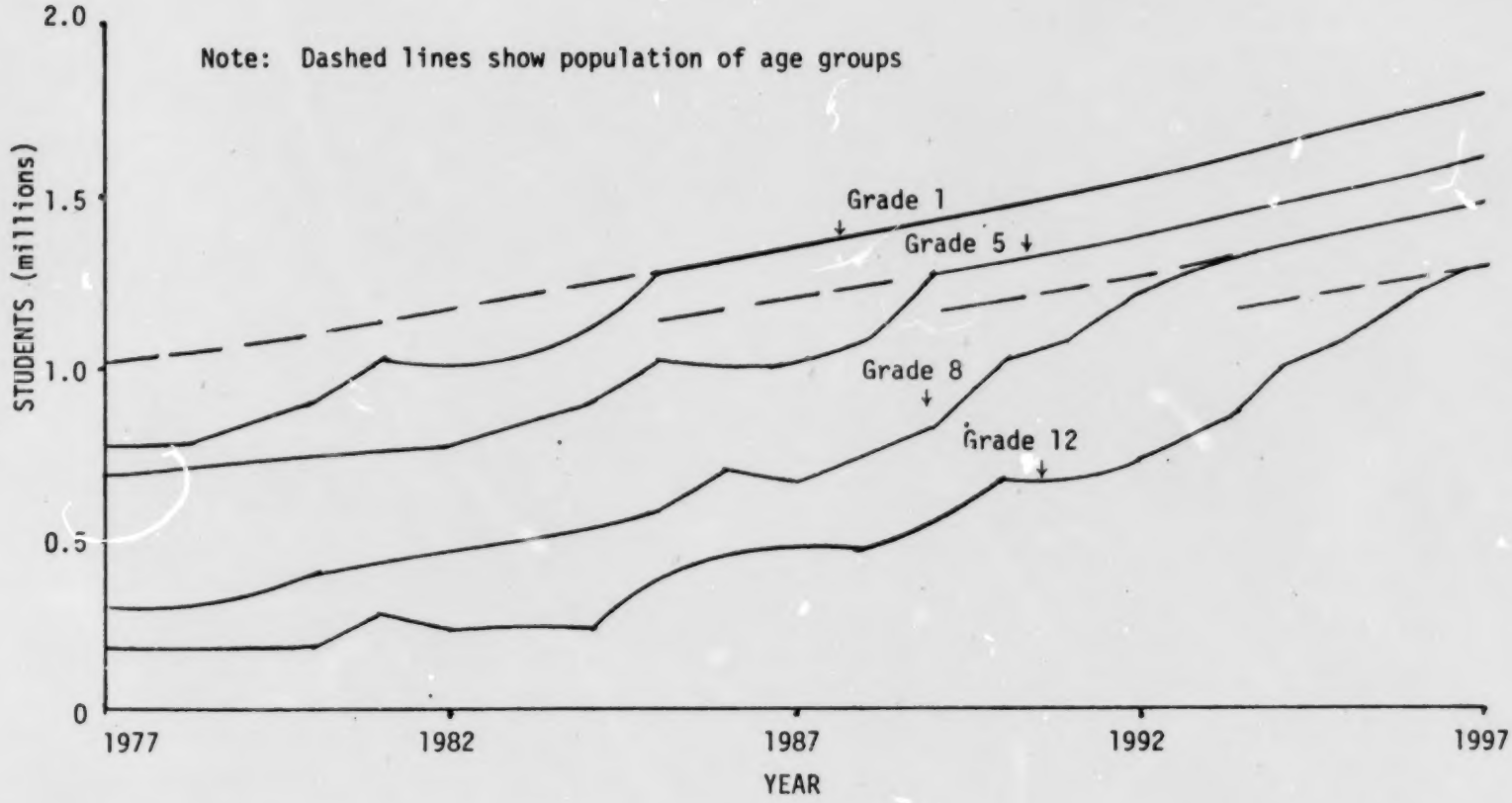


Fig. 7 Student Enrollments: Limited Case with TV.

C. LITERACY

The recommended use of television and radio in adult literacy is discussed in detail in Ref. 4.

The adult literacy programs of Iran recently have been organized under the National World Literacy Campaign. The Campaign's first objective is to satisfy basic requirements in literacy and mathematics. Subsequent programs are intended to develop broader objectives of adult education. The basic programs aim to reduce illiteracy to about 15% by 1987.

The current phase of the program is concentrating on developing the community-based organization and motivation of people to participate in the campaign. It is recommended that ERTI, through joint planning with the Campaign, support this effort with motivational and reinforcement programs on radio and television.

The curricula, workbooks, and teachers' guides for the basic programs are currently under development by the Literacy Campaign. They have already been tested in pilot programs and will be developed more in application in the next year. In Pakistan the effectiveness of a non-television literacy program was greatly increased by adding simple-format television programs presented by an effective literacy teacher. It is recommended that ERTI assist the campaign to develop similar programs to supplement the basic campaign. The programs could include supplements for the orientation and training of the literacy teachers in the community.

The amount of television programming required would be 30 to 70 hours, depending on how extensively television is used beyond application to the basic skills.

In the advanced programs being considered by the Campaign, there are educational areas contemplated which are considered elsewhere in this report. A campaign component, "Winter Agricultural Courses," for farmers is related to the agricultural programs described in Ref. 5. The regional broadcast schedules for the agricultural programs (see Section D) have made provision for concentrated broadcasts in the

Winter to complement a literacy campaign project of this kind.

Development of media support for other occupational training programs of the Campaigr should consider the guidelines described in Ref. 8 (see Section E). It is recommended that a joint planning group continue to review the needs of the Campaign in the advanced program areas. The potential for useful television applications is large, but the Campaign has not yet gotten to the detailed planning stage.

D. FARMER EDUCATION

The recommended use of television in the education of Iran's farmers is discussed in detail in Ref. 5.

To obtain the desired threefold increase in food production will require improvement in the management of 2-1/2 million small and medium-sized traditional farms. These farms contain 84% of the agricultural land and produce over 77% of the food.

The National Cropping Plan concludes that the resources needed for the increased production are available; a major limitation, however, is the ability to introduce more efficient techniques to the farmers. The farm extension service, although large, is not nearly large enough to meet regularly with the farmers to provide them with the needed information.

It is recommended that television broadcasts of the needed information be used to extend the effectiveness of the extension service. Lead farmers in each community would help organize others to watch the programs and discuss the recommendations. They would also provide local contact to the extension service workers.

For effective use of television in this application, it is necessary to ensure that only simple messages that the farmer can act on be included in the programs. Messages concerning more complex techniques must refer the farmer to local advisors. It is also necessary to broadcast much of the material at specific times. (E.g., advice on planting should come a week or two before the crop is to be planted.) Broadcast schedules must account for the variation in crops and growing seasons in different parts of Iran.

By working with subject-area experts of Iran's Ministry of Agriculture, the developers of the National Cropping Plan, and experts from the Food and Agricultural Organization and U.S. Universities, a set of agricultural programs have been defined to meet these objectives.

The programs are designed to support the improvements recommended by the National Cropping Plan. The major topic areas are shown in Table VII (Ref. 5, page 7). Each of these major areas is covered by a series of course elements. Table VIII (Ref. 5, page 59), for example, illustrates the subtopics in Animal Husbandry. Each subtopic is defined by one or more 15-minute broadcast segments. In all, approximately 50 hours of programming will cover the areas critical to Iran's agricultural growth.

To be effective, the programs should be broadcast in ten different regional schedules to meet the variety of agroclimatic conditions in Iran. See Fig. 8 (Ref. 5, page 170). The programs fit easily into three half-hour broadcasts per week (accounting for national holidays and religious periods and for necessary repeat broadcasts).

It is recommended that ERTI, together with the Ministry of Agriculture, develop the series of programs defined in Ref. 5 to support Iran's agricultural development. The Ministry of Agriculture experts already assigned to NIRT have contributed to the course definition and can serve as advisors in producing the specific programs.

Initial course elements in the production should be used to develop production guidelines to ensure that the production techniques used are effective with the farmers. A pilot program should also help define the effective role of lead farmers in the community in relation to the programs (Ref. 2, Chapter VII).

E. OCCUPATIONAL TRAINING

Guidelines for use of media in Occupational Training are presented in Ref. 7.

The effectiveness of occupational training for managerial and administrative personnel, for clerical, sales and service personnel, and

Table VII
LIST OF COURSES

TOPIC	PRODUCTION TIME (hours)
(A) Farm Management	3.5
(B) Animal Husbandry	17.25
(C) Agricultural Machinery	4.25
(D) Soils and Soil Conservation	2.0
(E) Water Conservation and Crop Irrigation	3.0
(F) Fertilizer Application	2.75
(G) Weed Control	1.75
(H) Plant Disease	1.50
(I) Pest and Insect Control	2.25
(J) Additional Information for Specific Crops	4.5
TOTAL HOURS OF PRODUCTION TIME	43.25

Table VIII

Course Topics: Animal Husbandry

Course Number	Production Time (minutes)	Topic
(1) Livestock (cattle, sheep and goats)		
B1	30	Animals and Their Economic Benefit
B2	90	Food Availability
B3	30	Livestock Housing
B4	120	Proper Feeding of Livestock
B5	15	Nutrition and Reproduction
B6	75	Selection of Breeding Animals
B7	60	Breeding Types
B8	30	Artificial Insemination
B9	60	Care of Lambs and Calves
B10	60	Meat Production
B11	30	Marketing of Livestock
B12	90	Milk Production and Handling of the Milk
B13	120	Management of Infectious Disease and Disease Prevention
B14	60	Animal Producers Organization in Villages
B15	30	Carpet Wool Production
Subtotal	900 min. = 15 hrs.	

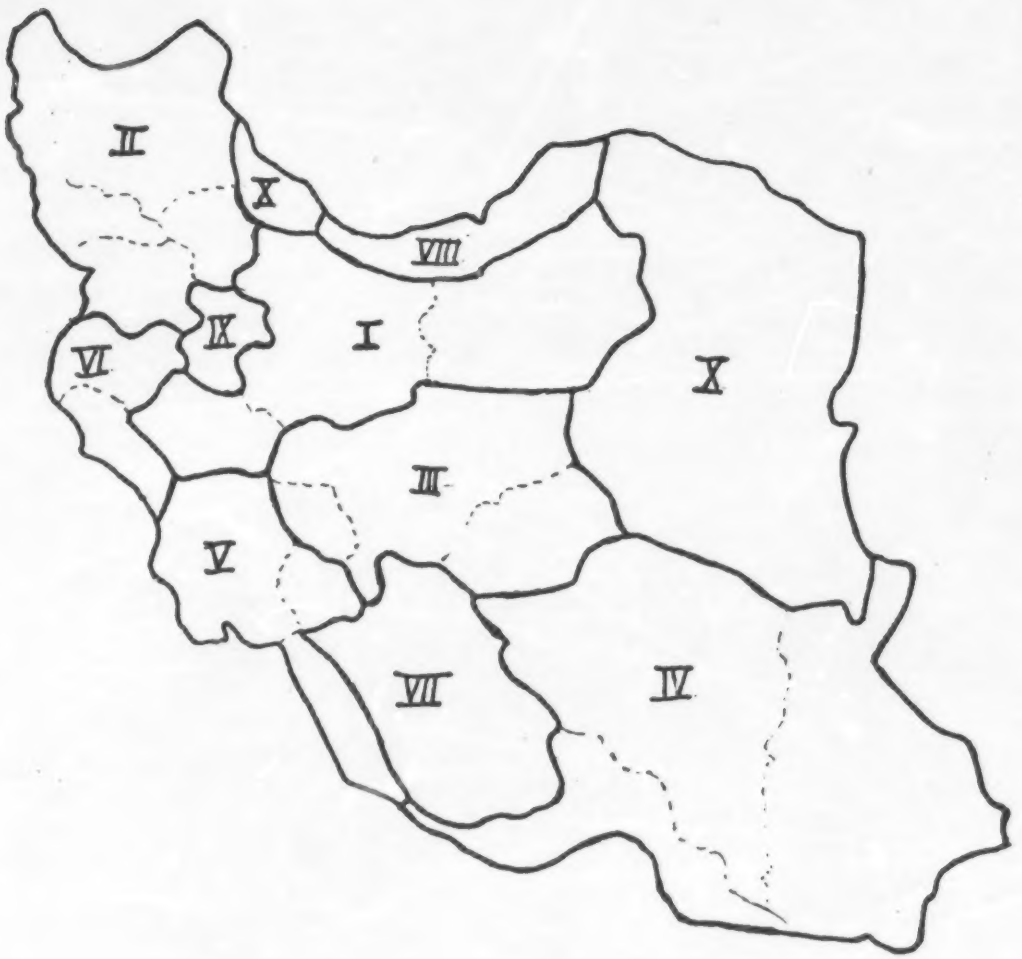


Fig. 8 Areas with Common Broadcast Schedules for Selected Crops

for industrial personnel was reviewed by studying effective applications in American institutions. The practices effective in America are with some exceptions, applicable to Iranian needs.

The most important application at the mangerial level is the use of television cassettes to convey executive messages to branches of institutions in other cities. Major government and private institutions in Iran have branch offices in cities scattered throughout the country. Video cassettes can be used to convey important messages, policy decisions, and program status to these offices. ERTI could provide recording facilities to ministries and institutions that would benefit from this use.

On the clerical, sales, and service level, there are many occupations where on-the-job training without media is the simplest and most effective. There are others, however, where simple use of audio tape, slide-audio tape, or video cassette can reduce the cost of training and give more uniform results. In the majority of these applications, training at the job location is essential. To be effective, instructions must be interspersed closely with actual practice of the skill on the job or in a simulated job situation. Employees already skilled in the job can provide the necessary mentor guidance to the trainee.

Guidelines are given for selection of media for different occupations. The selection of particular projects by ERTI in occupational training will be complex because of the very large number of occupations and the variation in practices even within an occupation. Training in clerical skills is one of the most important needs of the growing economy. It is recommended that ERTI review potential projects in these and other areas, following the guidelines of Ref. 7 and reviewing the potential size of audience for any media course to be developed.

In industrial training, the guidelines for effective media use are similar to those of clerical and service occupations. The main difference is in the educational level and motivation of the trainees. Since literacy would generally be much lower, the training packages need to rely more on visual messages, requiring generally more expen-

sive production. Effective training at this level will also rely, for motivation, on the trainee's view of the relation between his mastery of the skill and job security or pay level.

Training of industrial occupations usually must be done on the job rather than in a separate school. Selection of projects by ERTI should be based directly on the needs of large employers interested in using the media packages or on a potentially large number of smaller institutions with very similar needs.

As with the clerical and sales occupatio..s, ERTI should be careful to select the projects with greatest potential for Iran from among the many potential applications. To help in such decisions, reference 7 presents data on the numbers and projected growth of employees in different occupations.

CHAPTER III
ERTI RESOURCES

The reports - Refs. 1 through 7 - consider specific educational needs of Iran and the role that ERTI can play in helping the nation to meet those needs. These instructional services involve direct interaction with students or trainees, specific learning objectives, and support staff and materials. Whether the instruction occurs in a formal (credentialing) institution such as universities or in less formal settings such as Farmer Education or Adult Literacy, the applications can be considered quantitatively (as they were in the planning reports).

The recommended role for ERTI in these areas would make maximum use of existing resources and use cost-effective production techniques suited to the application. As a result, the applications recommended as highest priority for Iran's instructional needs do not make use of all of ERTI's capabilities.

There are applications in general audience and informational programming which although not easily subjected to quantitative evaluation, are nonetheless important to Iran's development. Such program areas are listed in Table IX (Ref. 8, page 14) and discussed in the report.

ERTI's resources are summarized in Table X (Ref. 8, page 13). The current commitments and proposed programs in Higher Education, Literacy, Agricultural Training, and Teacher Training would occupy only about half of the resources. (Higher Education places most responsibility on existing institutions.) It is recommended that the remaining capacity be allocated to projects in topical and motivational programming and to selected areas of Occupational Training. Reference 8 recommends a more formal procedure than has been used in the past for developing new proposals, submitting them to planning review, and, if approved, committing production and evaluation resources.

A suggested schedule for planning and implementing the different program areas is presented in Fig. 9 (Ref. 8, page 27). The activities include review and evaluation of existing projects.

Table IX

Potential ERTI Program Areas

---

1. General Audience

   - Cultural programs
     - preserve elements of traditional Iranian culture
     - suggest adaptation of tradition to modern conditions
     - suggest role models for a new way of life
   - Topical issues, e.g., drugs, status of education, ERTI's role, 17 points of the White Revolution
   - Promote an exchange of ideas among communities and between people and the government.
   - Motivation programs to increase public participation in education and development activities.
   - Preschool - aimed at both the home and preschool institutions.

2. Informational Services

   - Identification of social services and means of access, e.g., participation in social security.
   - Identification of sector support services and means of access, e.g., agricultural extension agent activities.
   - Services identified as necessary for the support of ERTI instructional activities.
   - Public education programs on subjects such as health care, nutrition, sanitation, family life, child care, religion, career guidance, personal finance, home maintenance and automobile maintenance.

Table X

ERTI Capabilities

Existing or Planned

- TV broadcasting. On the order of 50% of the nation's population is covered. Time is limited since ERTI has to use the network channels but additional channels can be added in areas of existing coverage at small cost. Satellite transmission will be able to provide full coverage in the future.

- Radio broadcasting. Close to 100% of the population is covered by radio. No information is presently available on the time that ERTI can claim.

- TV production. With the new facilities some 300 to 700 hours of programming can be produced per year. This assumes the use of techniques similar to what is now being used.

- Radio production. Some 1,000 to 1,500 hours of programming can be produced per year with the new facilities. Very little radio programming is done right now.

- Multi-media production. Film, slides, audio tape, teaching machines and books can be designed and produced.

- Teaching concepts can be developed and applied, perhaps independently of the media.

- Learning Resource Centers. Their role is not yet defined, but could include a variety of support activities for communities:

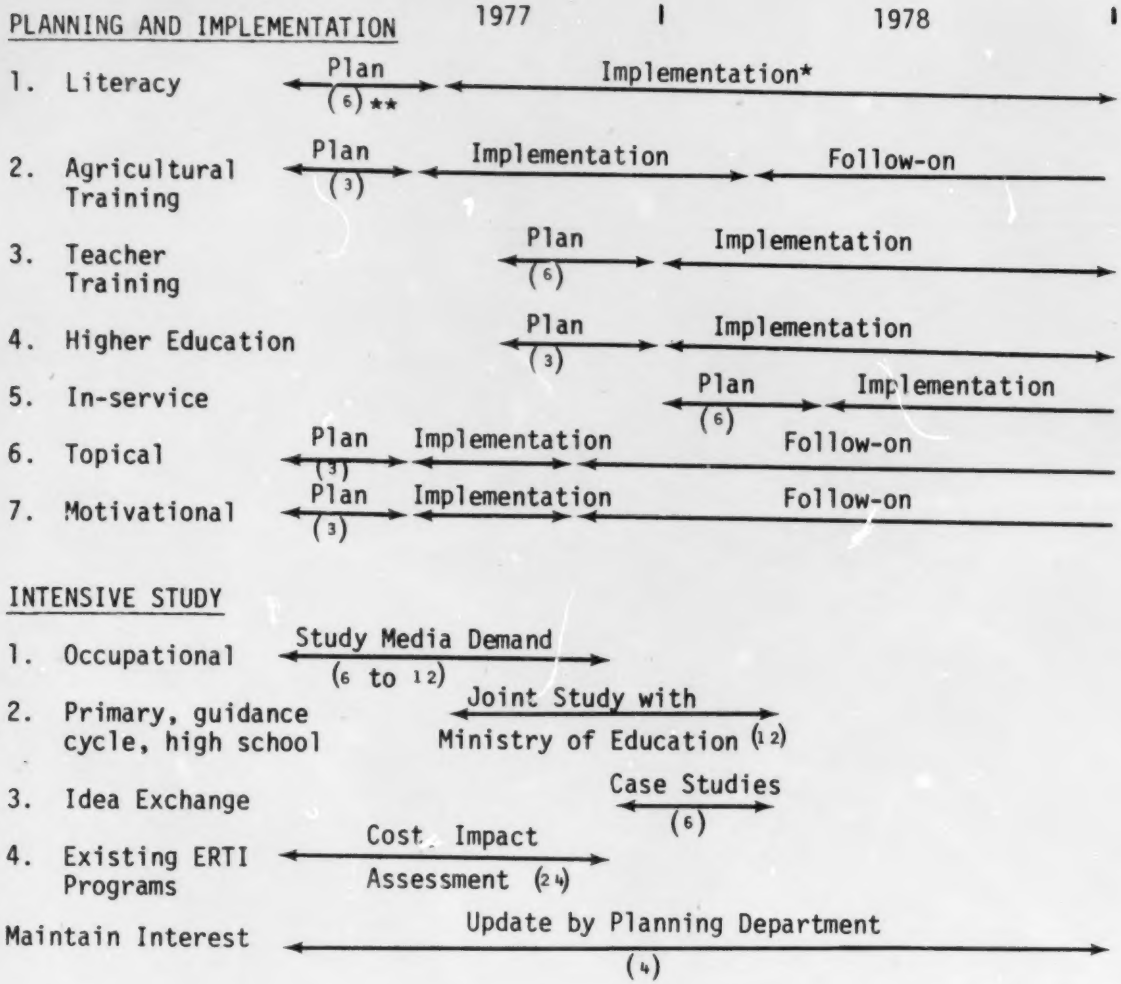
  - library of books and audio-visual materials in support of local schools and the community in general

  - classroom for adult education and training programs

  - provision of staff to serve as coordinators or even mentors in education and development activities

Possible

- Mobile units might be considered which would be similar to Learning Resource Centers but play a more direct role in supporting communications between communities.



*Implementation includes detailed planning, design, production, etc.

**Numbers in parentheses indicate level of effort in person-months

Fig. 9 Suggested Schedule

Specific recommendations also have been made on organization and management procedures.

To meet its objectives, ERTI will require an efficient information system to facilitate storage and retrieval of reports, books, films, and tapes used in the different activities. A review of such systems has been made, and specific recommendations are contained in Ref. 9.

For quickly building a library of educational research materials, it is recommended that ERTI first acquire the ERIC Microfische System with its collection of English-language reports, and then add Farsi materials to the collection as they are accumulated.

It is recommended also that ERTI establish a Production Archives facility to handle television broadcast tapes and stock film footage. Initial needs would be satisfied with a manual system. Physical needs, procedures, and training programs are described in Ref. 9. Once the manual procedures are established, the system can be computerized with a mini-computer similar to those used by the United States commercial networks, CBS and NBC. The recommended manual procedures are designed for easy computerization. Report No. 9 contains the details of the recommended system as well as a review of Italian and Japanese systems believed to be less appropriate for ERTI's needs.

These recommendations concern ERTI's special information handling needs. For ERTI's general computer requirements (primarily for Fortran programs and statistical analyses), it is recommended that ERTI use the central NIRT computer facility.

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AUTHOR'S NOTE

This summary was prepared with the assistance of the Institute of Communication Research, Department of Communication, Stanford University, Professor Lyle M. Nelson, Chairman.